UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P O Box 1450
Alexandria, Virginia 22313-1450
www uspto gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/814,847	03/30/2004	Yoshifumi Nishida	SON5180.41A1	6496

36813 7590 12/24/2008

O'BANION & RITCHEY LLP/ SONY ELECTRONICS, INC.
400 CAPITOL MALL
SUITE 1550
SACRAMENTO, CA 95814

EXAMINER	
ADDY, ANTHONY S	

ART UNIT	PAPER NUMBER
2617	

MAIL DATE	DELIVERY MODE
12/24/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/814,847	Applicant(s) NISHIDA ET AL.
	Examiner ANTHONY S. ADDY	Art Unit 2617

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 November 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13,16-27,29-31,33-36,39-45 and 47-49* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13, 16-27, 29-31, 33-36, 39-45 and 47-49* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 06, 2008 has been entered. **Claims 1-13, 16-27, 29-31, 33-36, 39-45** and **47-49** are pending in the present application.

Response to Arguments

2. Applicant's arguments with respect to **claims 1-13, 16-27, 29-31, 33-36, 39-45** and **47-49** have been considered but are moot in view of the new ground(s) of rejection. Arguments are directed to newly added limitations and the new ground(s) of rejection based on the newly added limitations follow below.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 1-13, 16-27, 29-31, 33-36, 39-45** and **47-49** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 1, applicant recites the limitation “the larger IEEE 802.11 data packet frame” on lines 7-8 of claim 1, however there is insufficient antecedent basis for this limitation in the claim.

With respect to claim 16, applicant recites the limitation “the IP data packet structure” on line 7 of claim 16, however there is insufficient antecedent basis for this limitation in the claim.

With respect to claim 16, applicant recites the limitation “the larger IEEE 802.11 data packet frame” on lines 7-8 of claim 16, however there is insufficient antecedent basis for this limitation in the claim.

With respect to claim 16, applicant recites the limitation “the Maximum Transmission Unit (MTU)” on line 13 of claim 16, however there is insufficient antecedent basis for this limitation in the claim.

With respect to claim 30, applicant recites the limitation “the larger IEEE 802.11 data packet frame” on lines 8-9 of claim 30, however there is insufficient antecedent basis for this limitation in the claim.

With respect to claim 36, applicant recites the limitation “the larger IEEE 802.11 data packet frame” on lines 6-7 of claim 36, however there is insufficient antecedent basis for this limitation in the claim.

With respect to claim 48, applicant recites the limitation “the Maximum Transmission Unit (MTU)” on line 5 of claim 48, however there is insufficient antecedent basis for this limitation in the claim.

With respect to claims 2-13, 17-27, 29, 31, 33-35, 39-45 and 47-49, they include the same issues explained above for parent claims 1, 16, 30 and 36, and are rejected for the same reasons as explained above.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1, 2, 4-7, 16-24, 36, 39-45 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Eccles et al., U.S. Patent Number 7,376,091 (hereinafter Eccles)** and further in view of **Tong et al., U.S. Publication Number 2002/0150040 A1 (hereinafter Tong).**

Regarding claim 1, Eccles teaches an apparatus for performing Transmission Control Protocol/Internet Protocol (TCP/IP) data packet transfers over an IEEE 802.11 network (see col. 3, lines 14-25, col. 6, lines 39-50, col. 11, lines 14 and Fig. 1), comprising: a network interface (*e.g., 802.11 interface 56 & 60*) configured according to IEEE 802.11 for communication over a network according to a TCP/IP layered communication protocol (see col. 3, lines 53-61 and col. 6, lines 39-50); a media access communication (MAC) layer within said network interface (see col. 6, lines 53-61); and wherein an IP data packet structure is used within the larger IEEE 802.11 data packet frame of a media access communication layer, leaving additional bytes within the IEEE 802.11 data packet frame (see col. 6, lines 24-33, col. 16, lines 46-51 [*i.e., the claimed*

features of wherein an IP data packet structure is used within the larger IEEE 802.11 data packet frame of a media access communication layer, leaving additional bytes within the IEEE 802.11 data packet frame is met by the teaching of Eccles that IP packets are encapsulated within an 802.11 MAC sub-layer packet, wherein the 802.11 sub-layer packet has a size of 2312 bytes and has an FCS field for carrying Cyclic Redundancy Code (CRC) for providing error checking for the data frame so that the ultimate recipient of the frame can determine whether the frame was accurately received]);means for optimizing data transfers as controlled from within said MAC layer by formatting network packets for Internet Protocol (IP) transmission and then adding additional bytes for IEEE 802.11 transmission of Forward Error Correction (FEC) and checksums (see col. 6, lines 24-30 and Fig. 2; *shows a FCS field 96 for carrying a Cyclic Redundancy Code (CRC) which reads on the transmission of FEC and checksums within the 802.11 frame*).

Eccles further teaches if a transmitted data is lost or incorrectly received at a receiving station, after a predetermined period of time, the transmitting station would resend the packet to the receiving station (see col. 4, line 59 through col. 5, line 3), but fails to explicitly teach performing partial packet retransmissions.

In an analogous field of endeavor, Tong teaches a method and system of controlling retransmission of improperly received information, wherein upon receiving a negative acknowledgment (NAK) from a receiver indicating that a packet was corrupted and not properly received, the packet for retransmission is divided into a number of segments, referred to as subpackets and is then injected into a subsequent packet and

transmitted to the receiver (see p. 2 [0024]). According to Tong, the receiver will recover the subpackets from an incoming sequence of packets, decode normal packets, and reconstruct retransmitted packets from the recovered subpackets (see p. 2 [0024] and p. 3 [0033]). Tong further teaches the decoded packets are sent to an error checking logic to determine if the decoded packet was properly received, and preferably, a cyclic redundancy check (CRC) algorithm is used to determine the integrity of the decoded packet (see p. 3 [0030]).

It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to modify Eccles with the teachings of Tong to a include a means for performing partial packet retransmissions, in order to provide an improved automatic repeat request (ARQ) based protocol that facilitates continuous data transmission while supporting retransmission of corrupted data as taught by Tong (see p. 1 [0007-0008]).

Regarding claim 2, Eccles teaches an apparatus for performing Transmission Control Protocol/Internet Protocol (TCP/IP) data packet transfers over an IEEE 802.11 network (see col. 3, lines 14-25, col. 6, lines 39-50, col. 11, lines 14 and Fig. 1), comprising: a network interface (*e.g., 802.11 interface 56 & 60*) configured according to IEEE 802.11 for communication over a network according to a TCP/IP layered communication protocol (see col. 3, lines 53-61 and col. 6, lines 39-50); a media access communication (MAC) layer within said network interface (see col. 6, lines 53-61); and at least one optimization process executing within said MAC layer and configured for formatting and processing network packets (see col. 2, lines 15-31, col. 3, lines 53-61 and col. 6, lines 31-50).

Eccles further teaches if a transmitted data is lost or incorrectly received at a receiving station, after a predetermined period of time, the transmitting station would resend the packet to the receiving station (see col. 4, line 59 through col. 5, line 3), but fails to explicitly teach wherein said optimization processing comprises performing partial packet retransmission by dividing each Internet Protocol (IP) packet into multiple data blocks and adding Forward Error Correction (FEC) or checksum information for the data blocks within additional data bytes defined within the IEEE 802.11 frame which are not utilized in IP protocol frames, and retransmitting blocks by piggybacking them within said extra bytes within the IEEE 802.11 frame.

In an analogous field of endeavor, Tong teaches a method and system of controlling retransmission of improperly received information, wherein upon receiving a negative acknowledgment (NAK) from a receiver indicating that a packet was corrupted and not properly received, the packet for retransmission is divided into a number of segments, referred to as subpackets and is then injected into a subsequent packet and transmitted to the receiver (see p. 2 [0024]). According to Tong, the receiver will recover the subpackets from an incoming sequence of packets, decode normal packets, and reconstruct retransmitted packets from the recovered subpackets (see p. 2 [0024] and p. 3 [0033]). Tong further teaches the decoded packets are sent to an error checking logic to determine if the decoded packet was properly received, and preferably, a cyclic redundancy check (CRC) algorithm is used to determine the integrity of the decoded packet (see p. 3 [0030]). Furthermore, Eccles teaches the frame length for the 802.11 data frame can range from 0 bytes to 2312 bytes and the FCS field

carries a Cyclic Redundancy Code (CRC) which reads on adding FEC or checksum information for the data blocks within additional data bytes defined within the IEEE 802.11 frame which are not utilized in IP protocol frames (see col. 6, lines 24-50 and Fig. 2; *shows an IEEE 802.11 data frame*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to modify Eccles with the teachings of Tong to a include an apparatus comprising: wherein said optimization processing comprises performing partial packet retransmission by dividing each IP packet into multiple data blocks and adding FEC or checksum information for the data blocks within additional data bytes defined within the IEEE 802.11 frame which are not utilized in IP protocol frames, and retransmitting blocks by piggybacking them within said extra bytes within the IEEE 802.11 frame, in order to provide an improved automatic repeat request (ARQ) based protocol that facilitates continuous data transmission while supporting retransmission of corrupted data as taught by Tong (see p. 1 [0007-0008]).

Regarding claim 4, Eccles in view of Tong teaches all the limitations of claim 2. Eccles in view of Tong further teaches an apparatus, wherein said partial packet retransmission system is configured for dividing a network packet frame into a plurality of data blocks including a first plurality of retransmission data blocks for retransmissions between a sender and a receiver (see *Tong*, p. 2 [0024] and p. 3 [0033]).

Regarding claim 5, Eccles in view of Tong teaches all the limitations of claim 4. Eccles in view of Tong further teaches an apparatus, wherein said plurality of data blocks further includes a second plurality of payload data blocks configured for

transmitting payload information from said sender to said receiver (see *Tong*, p. 2 [0024] and p. 3 [0033]).

Regarding claim 6, Eccles in view of Tong teaches all the limitations of claim 5. Eccles in view of Tong further teaches an apparatus, wherein said plurality of data blocks further comprise checksum data for recovering data bit errors in said plurality of data blocks for increasing the reliability of the transmission of said plurality of data blocks (see *Eccles*, col. 6, lines 24-50 and *Tong*, p. 2 [0024] and p. 3 [0030 & 0033]).

Regarding claim 7, Eccles in view of Tong teaches all the limitations of claim 6. Eccles in view of Tong further teaches an apparatus, wherein said checksum data is implemented in a software scheme (see *Eccles*, col. 6, lines 24-50 and *Tong*, p. 3 [0030]).

Regarding claim 16, Eccles teaches a method of optimizing Transmission Control Protocol/Internet Protocol (TCP/IP) data packet transfer over an IEEE 802.11 wireless network (see col. 3, lines 14-25, col. 6, lines 39-50, col. 11, lines 14 and Fig. 1), comprising: communicating over a IEEE 802.11 wireless standard between a sender and receiver according to a TCP/IP layered communication protocol (see col. 3, lines 53-61 and col. 6, lines 39-50); and wherein the IP data packet structure is used within the larger IEEE 802.11 data packet frame of a media access communication layer, leaving additional bytes within the IEEE 802.11 data packet frame (see col. 6, lines 24-33, col. 16, lines 46-51 [*i.e., the claimed features of wherein an IP data packet structure is used within the larger IEEE 802.11 data packet frame of a media access communication layer, leaving additional bytes within the IEEE 802.11 data packet frame*

is met by the teaching of Eccles that IP packets are encapsulated within an 802.11 MAC sub-layer packet, wherein the 802.11 sub-layer packet has a size of 2312 bytes and has an FCS field for carrying Cyclic Redundancy Code (CRC) for providing error checking for the data frame so that the ultimate recipient of the frame can determine whether the frame was accurately received]).

Eccles further teaches if a transmitted data is lost or incorrectly received at a receiving station, after a predetermined period of time, the transmitting station would resend the packet to the receiving station (see col. 4, line 59 through col. 5, line 3), but fails to explicitly teach dividing a network packet frame into a plurality of data blocks; and partially retransmitting untransmitted data blocks in plurality of data blocks corresponding to the network packet frame by piggybacking them within said extra bytes of space in a frame under the IEEE 802.11 wireless standard which are not available in the Maximum Transmission Unit (MTU) size utilized with the Internet Protocol (IP) within the IEEE 802.11 frame.

In an analogous field of endeavor, Tong teaches a method and system of controlling retransmission of improperly received information, wherein upon receiving a negative acknowledgment (NAK) from a receiver indicating that a packet was corrupted and not properly received, the packet for retransmission is divided into a number of segments, referred to as subpackets and is then injected into a subsequent packet and transmitted to the receiver (see p. 2 [0024]). According to Tong, the receiver will recover the subpackets from an incoming sequence of packets, decode normal packets, and reconstruct retransmitted packets from the recovered subpackets (see p. 2 [0024]

and p. 3 [0033]). Tong further teaches the decoded packets are sent to an error checking logic to determine if the decoded packet was properly received, and preferably, a cyclic redundancy check (CRC) algorithm is used to determine the integrity of the decoded packet (see p. 3 [0030]). Furthermore, Eccles teaches the frame length for the 802.11 data frame can range from 0 bytes to 2312 bytes and the FCS field carries a Cyclic Redundancy Code (CRC) which reads on adding FEC or checksum information for the data blocks within additional data bytes defined within the IEEE 802.11 frame which are not utilized in IP protocol frames (see col. 6, lines 24-50 and Fig. 2; *shows an IEEE 802.11 data frame*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to modify Eccles with the teachings of Tong to a include a method, comprising: dividing a network packet frame into a plurality of data blocks; and partially retransmitting untransmitted data blocks in plurality of data blocks corresponding to the network packet frame by piggybacking them within said extra bytes of space in a frame under the IEEE 802.11 wireless standard which are not available in the MTU size utilized with the IP protocol within the IEEE 802.11 frame, in order to provide an improved automatic repeat request (ARQ) based protocol that facilitates continuous data transmission while supporting retransmission of corrupted data as taught by Tong (see p. 1 [0007-0008]).

Regarding claim 17, Eccles in view of Tong teaches all the limitations of claim 17. Eccles in view of Tong further teaches a method, further comprising checking each of the plurality of data blocks in the network packet frame using a forward error correction

(FEC) information scheme attached to the network packet frame to determine whether a particular data block in the plurality of data blocks is correct or recoverable (see *Eccles*, col. 4, lines 61-64 and col. 6, lines 24-50 and *Tong*, p. 3 [0030]).

Regarding claim 18, Eccles in view of Tong teaches all the limitations of claim 17. Eccles in view of Tong further teaches a method, wherein said checking is configured for sending an acknowledgment by said receiving-node to said sending node with reference to a transmitted network packet frame in response to said plurality of data blocks being correct or recoverable (see *Eccles*, col. 4, lines 61-64 and col. 6, lines 24-50 and *Tong*, p. 3 [0030 & 0033]).

Regarding claim 19, Eccles in view of Tong teaches all the limitations of claim 17. Eccles in view of Tong further teaches a method, wherein said checking is configured for sending a partial acknowledgment from said receiving node to said sending node with respect to a transmitted network packet frame, in response to said plurality of data blocks being corrupt or unrecoverable (see *Eccles*, col. 4, lines 61-64 and col. 6, lines 24-50 and *Tong*, p. 3 [0030 & 0033]).

Regarding claim 20, Eccles in view of Tong teaches all the limitations of claim 19. Eccles in view of Tong further teaches a method, wherein said checking is configured for transmitting a negative acknowledgment from said receiving node to said sending node to request retransmission of an entire network packet frame, in response to determining that said number of corrupt data blocks in said plurality of data blocks exceeds a threshold and said retransmitted data blocks are corrupt (see *Eccles*, col. 4, lines 61-64 and col. 6, lines 24-50 and *Tong*, p. 2 [0024-0025] and p. 3 [0030 & 0033]).

Regarding claim 21, Eccles in view of Tong teaches all the limitations of claim 19. Eccles in view of Tong further teaches a method, wherein said sending of said partial acknowledgment comprises piggybacking the unrecoverable or the corrupt data blocks in a subsequent network packet frame transmission from said sending node to said receiving node (see *Tong*, p. 2 [0024-0025] and p. 3 [0030 & 0033]).

Regarding claim 22, Eccles in view of Tong teaches all the limitations of claim 21. Eccles in view of Tong further teaches a method, wherein upon said sending node receiving a partial acknowledgment from said receiving nodes, said sending node piggybacks unreceived data blocks on the data frames which will be transmitted next (see *Tong*, p. 2 [0024-0025] and p. 3 [0030 & 0033]).

Regarding claim 23, Eccles in view of Tong teaches all the limitations of claim 22. Eccles in view of Tong further teaches a method, wherein the space for said piggyback comprises space in the network data frame which is approximately 800 bytes in length (see *Eccles*, col. 6, lines 24-26).

Regarding claim 24, Eccles in view of Tong teaches all the limitations of claim 23. Eccles in view of Tong further teaches a method, wherein said sending node retransmits the entire data frame if the maximum retransmission time is not exceeded when said sending node receives a negative frame transmission acknowledgment (see *Tong*, p. 2 [0024-0025] and p. 3 [0030 & 0033]).

Regarding claim 36, Eccles teaches a wireless network (see col. 3, lines 14-15 and Fig. 1), comprising: a first network (*e.g., the Internet*) having a first network transport protocol comprising a Transport Control Protocol/Internet Protocol (TCP/IP)

(see col. 3, lines 20-25 and Fig. 1); a second network (*e.g., 802.11 WLAN*) having a second network transport protocol comprising an IEEE 802.11 wireless network (see col. 3, lines 15-28 and Fig. 1); wherein an Internet protocol (IP) data packet structure is used within the larger IEEE 802.11 data packet frame of a media access communication layer, leaving additional bytes within the IEEE 802.11 data packet frame (see col. 6, lines 24-33, col. 16, lines 46-51 [*i.e., the claimed features of wherein an IP data packet structure is used within the larger IEEE 802.11 data packet frame of a media access communication layer, leaving additional bytes within the IEEE 802.11 data packet frame is met by the teaching of Eccles that IP packets are encapsulated within an 802.11 MAC sub-layer packet, wherein the 802.11 sub-layer packet has a size of 2312 bytes and has an FCS field for carrying Cyclic Redundancy Code (CRC) for providing error checking for the data frame so that the ultimate recipient of the frame can determine whether the frame was accurately received*]); and a network data transfer optimization system coupled to a media access control layer of said second network and configured for optimizing data transfer between network nodes in said first network and said second network (see col. 2, line 17-31, col. 6, lines 39-50 and Fig. 1); wherein said optimization system utilizes ACK frames by the receiver to feedback information on unrecoverable or corrupted data blocks (see col. 4, lines 61-66).

Eccles further teaches if a transmitted data is lost or incorrectly received at a receiving station, after a predetermined period of time, the transmitting station would resend the packet to the receiving station (see col. 4, line 59 through col. 5, line 3), but fails to explicitly teach wherein upon receipt the sender can limit transmission to a

retransmission of unrecoverable or corrupted blocks without retransmitting the entire frame; and wherein said retransmitted unrecoverable or corrupted blocks are piggybacked in a subsequent frame by using extra byte space in the IEEE 802.11 frame which are not utilized in the IP frame.

In an analogous field of endeavor, Tong teaches a method and system of controlling retransmission of improperly received information, wherein upon receiving a negative acknowledgment (NAK) from a receiver indicating that a packet was corrupted and not properly received, the packet for retransmission is divided into a number of segments, referred to as subpackets and is then injected into a subsequent packet and transmitted to the receiver (see p. 2 [0024]). According to Tong, the receiver will recover the subpackets from an incoming sequence of packets, decode normal packets, and reconstruct retransmitted packets from the recovered subpackets (see p. 2 [0024] and p. 3 [0033]). Tong further teaches the decoded packets are sent to an error checking logic to determine if the decoded packet was properly received, and preferably, a cyclic redundancy check (CRC) algorithm is used to determine the integrity of the decoded packet (see p. 3 [0030]). Furthermore, Eccles teaches the frame length for the 802.11 data frame can range from 0 bytes to 2312 bytes and the FCS field carries a Cyclic Redundancy Code (CRC) (see col. 6, lines 24-50 and Fig. 2; *shows an IEEE 802.11 data frame*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to modify Eccles with the teachings of Tong to a include a wireless network, comprising: wherein upon receipt the sender can limit transmission to a

retransmission of unrecoverable or corrupted blocks without retransmitting the entire frame; and wherein said retransmitted unrecoverable or corrupted blocks are piggybacked in a subsequent frame by using extra bytes space in the IEEE 802.11 frame which are not utilized in the IP frame, in order to provide an improved automatic repeat request (ARQ) based protocol that facilitates continuous data transmission while supporting retransmission of corrupted data as taught by Tong (see p. 1 [0007-0008]).

Regarding claim 39, Eccles in view of Tong teaches all the limitations of claim 36. Eccles in view of Tong further teaches a wireless network, wherein said first network is an Ethernet network (see *Eccles*, col. 3, lines 20-25 & 42-46 and Fig. 1).

Regarding claim 40, Eccles in view of Tong teaches all the limitations of claim 36. Eccles in view of Tong further teaches a wireless network, wherein a 1500 byte Maximum Transmission Unit (MTU) is maintained to conform to the Internet Protocol (IP) architecture, while all 2312 bytes are utilized within an IEEE 802.11 frame; and wherein the additional 800 bytes are not utilized for carrying the IP packet, but are utilized for retaining forward error correction (FEC) information or checksum information and for partial packet retransmission (see *Eccles*, col. 6, lines 24-30 and Figs. 2 & 4 and *Tong*, p. 2 [0024] and p. 3 [0030 & 0033]).

Regarding claim 41, Eccles in view of Tong teaches all the limitations of claim 36. Eccles in view of Tong further teaches a wireless network, wherein said data transfer optimization system comprises a network data formatting unit (*e.g., a Network Access Point (NAP 54)*) configured for formatting network data packet frames transmitted in said second network (see *Eccles*, col. 2, lines 15-31, col. 6, lines 39-50 and Fig. 1).

Regarding claim 42, Eccles in view of Tong teaches all the limitations of claim 41. Eccles in view of Tong further teaches a wireless network, wherein said data transfer optimization system further comprises a network data packet retransmission unit configured for retransmitting partial data packets corresponding to the network data packet frames transmitted from a sending node to a receiving node when the network data packet frames include corrupt or unrecoverable data blocks (see *Eccles*, col. 4, line 59 through col. 5, line 3 and *Tong*, p. 2 [0024] and p. 3 [0033]).

Regarding claim 44, Eccles in view of Tong teaches all the limitations of claim 42. Eccles in view of Tong further teaches a wireless network, where said network data packet retransmission unit is configured for dividing up said network data packet frame into data blocks including a media access control layer header having information to enable the data packet frame to be transmitted between said first network and said second network (see *Tong*, p. 2 [0024] and p. 3 [0033]).

Regarding claim 45, Eccles in view of Tong teaches all the limitations of claim 44. Eccles in view of Tong further teaches a wireless network, wherein said data blocks further comprise checksum information for improving the reliability of data transmission between said first network and said second network (see *Eccles*, col. 6, lines 24-50 and Fig. 2 and *Tong*, p. 3 [0030]).

Regarding claim 48, Eccles in view of Tong teaches all the limitations of claim 1. Eccles in view of Tong further teaches an apparatus, wherein said partial packet retransmissions comprise dividing each Internet Protocol (IP) packet into multiple data blocks and adding Forward Error Correction (FEC) or checksum information for the data

blocks within extra bytes available in the IEEE 802.11 protocol which are not available in the Maximum Transmission Unit (MTU) of the IP protocol and retransmitting blocks by piggybacking them within said extra bytes within the IEEE 802.11 frame (see *Eccles*, col. 6, lines 24-30 and Fig. 2 and *Tong*, p. 2 [0024] and p. 3 [0030 & 0033]).

7. Claims 3, 10-13, 25-27, 29, 43, 47 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Eccles et al., U.S. Patent Number 7,376,091 (hereinafter Eccles)** and **Tong et al., U.S. Publication Number 2002/0150040 A1 (hereinafter Tong)** as applied to claims 1, 2, 16 and 41 above, and further in view of **Pazos, U.S. Patent Number 7,315,515 (hereinafter Pazos)**.

Regarding claims 3, 10, 25, 43 and 49, Eccles in view of Tong teaches all the limitations of claims 1, 2 and 41. Eccles in view of Tong fails to explicitly teach a wireless network, method and an apparatus, wherein the suppression of unnecessary packet acknowledgments comprises deleting a portion of the packet acknowledgments (ACKs), belonging to the same TCP connection and stored within the queue of the network interface, which are determined to be unnecessary to sustain proper network performance.

In an analogous field of endeavor, Pazos teaches a method and system for TCP acceleration, wherein the system includes an upstream queue for queuing packets, including acknowledgement packets and a means for receiving acknowledgment packets belonging to a TCP session (see col. 3, lines 26-41). According to Pazos, the system includes means for searching an upstream queue for queued acknowledgment

packets belonging to the same TCP session, and means for replacing one of the queued acknowledgment packets with the incoming acknowledgment packet in the position in the upstream queue occupied by the oldest of the queued acknowledgment packets if the incoming acknowledgment packet is not a duplicate of the queued acknowledgment packet (see col. 3, lines 26-50).

It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to modify Eccles and Tong with the teachings of Pazos to a include a wireless network and an apparatus, wherein the suppression of unnecessary packet acknowledgments comprises deleting a portion of the packet acknowledgments (ACKs), belonging to the same TCP connection and stored within the queue of the network interface, which are determined to be unnecessary to sustain proper network performance, in order to improve performance for TCP transfers by carefully discarding ACK packets congesting an upstream channel as taught by Pazos (see col. 4, lines 27-51).

Regarding claim 11, the combination of Eccles, Tong and Pazos teaches all the limitations of claim 10. The combination of Eccles, Tong and Pazos further teaches an apparatus, wherein said ACK suppression system speeds the transfer of network data for each ACK packet deleted in the TCP packet queue in the network (see *Pazos*, col. 4, lines 27-51).

Regarding claim 12, the combination of Eccles, Tong and Pazos teaches all the limitations of claim 10. The combination of Eccles, Tong and Pazos further teaches an apparatus, wherein said ACK suppression system is configured to piggyback

unreceived data blocks transmitted in a first of said plurality of data blocks partially transmitted within a second of said plurality of data blocks transmitted subsequent to the first when the sender receives a partial acknowledgment from the receiver (see *Tong*, p. 2 [0024] and p. 3 [0033] and *Pazos*, col. 3, lines 26-50).

Regarding claim 13, the combination of Eccles, Tong and Pazos teaches all the limitations of claim 12. The combination of Eccles, Tong and Pazos further teaches an apparatus, wherein said ACK suppression system is configured for having said sender retransmit the entire data frame if said sender receives a negative acknowledgment from the receiver for a transmitted data frame, and as long as the retransmission does not exceed a maximum retransmission time (see *Tong*, p. 2 [0024-0025] and p. 3 [0030 & 0033] and *Pazos*, col. 3, lines 26-50).

Regarding claim 26, the combination of Eccles, Tong and Pazos teaches all the limitations of claim 25. The combination of Eccles, Tong and Pazos further teaches a method, wherein said packet acknowledgments comprise transport control protocol (TCP) acknowledgments (see *Eccles*, col. 4, line 59 through col. 5, line 3 and *Tong*, p. 2 [0025] and p. 3 [0033]).

Regarding claim 27, the combination of Eccles, Tong and Pazos teaches all the limitations of claim 26. The combination of Eccles, Tong and Pazos further teaches a method, wherein said acknowledgment suppression system is configured for reducing the number of acknowledgments transmitted in bursts, thereby mitigating self-contention within the transport control protocol (TCP) communication (see *Pazos*, col. 3, lines 26-50 and col. 4, lines 27-51).

Regarding claim 29, the combination of Eccles, Tong and Pazos teaches all the limitations of claim 27. The combination of Eccles, Tong and Pazos further teaches a method, wherein said acknowledgment suppression system is configured to not delete the acknowledgment packet from the transport control protocol (TCP) packet queue when it is determined that said acknowledgement sequence number in the transport control protocol (TCP) packet queue is equal to the sequence number in the most recent TCP acknowledgment (see *Pazos*, col. 3, lines 26-50).

Regarding claim 47, the combination of Eccles, Tong and Pazos teaches all the limitations of claim 43. The combination of Eccles, Tong and Pazos further teaches a wireless network, wherein said network data packet transmission acknowledgment suppression system is configured to not delete an acknowledgement from the packet queue if its sequence number being transmitted in a transport control protocol (TCP) acknowledgment is equal to the packet in the most recent TCP acknowledgment (see *Pazos*, abstract and col. 3, lines 26-41).

8. Claims 30-31 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Eccles et al., U.S. Patent Number 7,376,091 (hereinafter Eccles)** and **Tong et al., U.S. Publication Number 2002/0150040 A1 (hereinafter Tong)** and further in view of **Pazos, U.S. Patent Number 7,315,515 (hereinafter Pazos)**.

Regarding claim 30, Eccles teaches a network data transfer optimization system for optimizing network packet communications between two-non-identical networks (*e.g., an IEEE 802.11 network and the Internet*) (see col. 3, lines 14-25 and Fig. 1), the

system comprising: a network packet data formatting unit (*e.g., a Network Access Point (NAP 54)*) configured for formatting network packets into frames for transmission from a first network comprising a Transport Control Protocol/Internet Protocol (TCP/IP) based network (*i.e., the Internet*) to a second network comprising an IEEE 802.11 wireless network (see col. 2, lines 15-31, col. 6, lines 39-50 and Fig. 1); wherein an Internet Protocol (IP) data packet structure is used within the larger IEEE 802.11 data packet frame of a media access communication layer, leaving additional bytes within the IEEE 802.11 data packet frame (see col. 6, lines 24-33, col. 16, lines 46-51 [*i.e., the claimed features of wherein an IP data packet structure is used within the larger IEEE 802.11 data packet frame of a media access communication layer, leaving additional bytes within the IEEE 802.11 data packet frame is met by the teaching of Eccles that IP packets are encapsulated within an 802.11 MAC sub-layer packet, wherein the 802.11 sub-layer packet has a size of 2312 bytes and has an FCS field for carrying Cyclic Redundancy Code (CRC) for providing error checking for the data frame so that the ultimate recipient of the frame can determine whether the frame was accurately received*]); and transmitting a frame under the IEEE 802.11 protocol and not used in the TCP/IP network between said first network and said second network (see col. 6, lines 24-50 and Fig. 2; *shows an IEEE 802.11 data frame*).

Eccles further teaches if a transmitted data is lost or incorrectly received at a receiving station, after a predetermined period of time, the transmitting station would resend the packet to the receiving station (see col. 4, line 59 through col. 5, line 3), but fails to explicitly teach a network packet retransmission unit configured for partially

retransmitting unreceived data blocks in the network packets by piggybacking the data within extra bytes which are available in a frame under the IEEE 802.11 protocol and not used in the TCP/IP network between said first network and said second network.

In an analogous field of endeavor, Tong teaches a method and system of controlling retransmission of improperly received information, wherein upon receiving a negative acknowledgment (NAK) from a receiver indicating that a packet was corrupted and not properly received, the packet for retransmission is divided into a number of segments, referred to as subpackets and is then injected into a subsequent packet and transmitted to the receiver (see p. 2 [0024]). According to Tong, the receiver will recover the subpackets from an incoming sequence of packets, decode normal packets, and reconstruct retransmitted packets from the recovered subpackets (see p. 2 [0024] and p. 3 [0033]). Tong further teaches the decoded packets are sent to an error checking logic to determine if the decoded packet was properly received, and preferably, a cyclic redundancy check (CRC) algorithm is used to determine the integrity of the decoded packet (see p. 3 [0030]). Furthermore, Eccles teaches the frame length for the 802.11 data frame can range from 0 bytes to 2312 bytes and the FCS field carries a Cyclic Redundancy Code (CRC) which reads on adding FEC or checksum information for the data blocks within additional data bytes defined within the IEEE 802.11 frame which are not utilized in IP protocol frames (see col. 6, lines 24-50 and Fig. 2; *shows an IEEE 802.11 data frame*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to modify Eccles with the teachings of Tong to a include a system

comprising: a network packet retransmission unit configured for partially retransmitting unreceived data blocks in the network packets by piggybacking the data within extra bytes which are available in a frame under the IEEE 802.11 protocol and not used in the TCP/IP network between said first network and said second network, in order to provide an improved automatic repeat request (ARQ) based protocol that facilitates continuous data transmission while supporting retransmission of corrupted data as taught by Tong (see p. 1 [0007-0008]).

The combination of Eccles and Tong fails to explicitly teach a network packet suppression unit configured for deleting a number of unnecessary network acknowledgment packets belonging to the same connection and stored on the packet queue and corresponding to network packets transmitted between said first network and said second network to enable a network connection to said first network.

In an analogous field of endeavor, Pazos teaches a method and system for TCP acceleration, wherein the system includes an upstream queue for queuing packets, including acknowledgement packets and a means for receiving acknowledgment packets belonging to a TCP session (see col. 3, lines 26-41). According to Pazos, the system includes means for searching an upstream queue for queued acknowledgment packets belonging to the same TCP session, and means for replacing one of the queued acknowledgment packets with the incoming acknowledgment packet in the position in the upstream queue occupied by the oldest of the queued acknowledgment packets if the incoming acknowledgment packet is not a duplicate of the queued acknowledgment packet (see col. 3, lines 26-50).

It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to modify Eccles and Tong with the teachings of Pazos to a include a system comprising: a network packet suppression unit configured for deleting a number of unnecessary network acknowledgment packets belonging to the same connection and stored on the packet queue and corresponding to network packets transmitted between said first network and said second network to enable a network connection to said first network, in order to improve performance for TCP transfers by carefully discarding ACK packets congesting an upstream channel as taught by Pazos (see col. 4, lines 27-51).

Regarding claim 31, the combination of Eccles, Tong and Pazos teaches all the limitations of claim 30. The combination of Eccles, Tong and Pazos further teaches a system, further comprising a network packet suppression unit configured for deleting a portion of unnecessary network acknowledgment packets belonging to the same connection and stored on the packet queue and corresponding to network packets transmitted between said first network and said second network to enable a network connection to said first network (see *Pazos*, col. 3, lines 26-50).

Regarding claim 33, the combination of Eccles, Tong and Pazos teaches all the limitations of claim 30. The combination of Eccles, Tong and Pazos further teaches a system, wherein said network packet data formatting unit (*e.g., a Network Access Point (NAP 54)*) is configured for formatting a data packet of said first network into a plurality of data blocks for transmission to said second network (see *Eccles*, col. 2, lines 15-31, col. 6, lines 39-50 and Fig. 1).

Regarding claim 34, the combination of Eccles, Tong and Pazos teaches all the limitations of claim 33. The combination of Eccles, Tong and Pazos further teaches a system, wherein said plurality of data blocks includes checksum data for determining whether a particular data block is corrupted or uncorrupted (see *Eccles*, col. 4, lines 61-64 and col. 6, lines 24-50 and *Tong*, p. 3 [0030]).

Regarding claim 35, the combination of Eccles, Tong and Pazos teaches all the limitations of claim 34. The combination of Eccles, Tong and Pazos further teaches a system, wherein said plurality of data blocks further includes forward error correction (FEC) data configured for recovering data from error bits in the plurality of data blocks (see *Eccles*, col. 4, lines 61-64 and col. 6, lines 24-50 and *Tong*, p. 3 [0030]).

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY S. ADDY whose telephone number is (571)272-7795. The examiner can normally be reached on Mon-Thur 8:00am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Eisen can be reached on 571-272-7687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Anthony S Addy/
Examiner, Art Unit 2617

/Alexander Eisen/
Supervisory Patent Examiner, Art Unit 2617
21-Dec-08